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## METHOD OF BLEACHING PAPER PULP AND APPARATUS FOR IMPLEMENTING THE METHOD

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It is known how to remove fibers from old papers and paper pulps by placing them in a funnel of a pulper and treating them with hot water or vapor for drying and mixing. At the end of this process, a cellulose pulp is obtained which is hot and, depending on the type of pulpers, has the proper density for bleaching at a low, medium, and high dryness.

In order to remove the fibers and for mixing, pulpers have been employed which comprise a rotary shaft on which hooks are located, with the rotating shaft rotating on the inside of a cylindrical housing at the output of the mixer. The paper pulp may be transferred in the form of a web onto which a bleaching agent, such as hydrogen peroxide was sprayed, with the pulp subsequently passing over the drying cylinders in order to accelerate

the reaction under the effect of heat or by allowing time for the bleaching operation to be completed (ex.: bleaching on pulp-drying machines or pulp press).

The paper pulp may also be simply placed in a tub and heated to a temperature of 40 to 60°, with a bleaching agent being added to the pulp.

Another method involves treating the pulp in a stationary tube in accordance with the above-described principles.

Another method also involves putting the paper pulp in a wagon, adding a bleaching agent, and then transporting this pulp in said wagon from one factory to another, with the bleaching operation being accomplished in the interval.

With all of these methods it must be noted that the bleaching process is accomplished after the pulping and mixing operation and results in a very long process and very high manufacturing costs.

It is therefore the object of the present invention to overcome these drawbacks. To this end, the invention relates to a method for the treatment of paper pulp, characterized in that the bleaching operation is combined with the mixing operation, with the two operations occurring at the same time; this simultaneity of the two operations allows the paper pulp to be bleached at a very fast rate, with the paper and the heat required for mixing already

meeting the necessary conditions for bleaching at the desired densities and dryness.

The invention also relates to a device for implementing the afore-described method or a similar process; said device is characterized by means such as the pulper/mixer equipped with a conduit for a bleaching liquid, which allows to accomplish the bleaching process of the paper pulp during the mixing operation.

In accordance with a characteristic of the invention, the conduit for the bleaching liquid is realized by a channel which opens into the upper portion of the pulper.

A non-limiting exemplary embodiment of the device according to the invention is illustrated in the drawings in which:

Figure 1 is a cross-sectional view of a horizontal pulper in accordance with the invention;

Figure 2 is a cross-sectional view of a vertical pulper in accordance with the invention;

Figure 2 is a cross-sectional perspective view of a disk pulper.

The pulper illustrated in Figure 1 comprises a cylindrical housing on the inside of which rotates a shaft 2 about itself. The shaft 2 is provided with a series of blades or hooks 3 which rotate at the same time as the shaft

2. The cylinder is provided on the inside with stationary hooks, and the assembly of movable and fixed hooks pulps and dries the old papers in order to transform them into a type of paste.

Mechanical and chemical pulps of any origin (fir, pines, leaves, annual plants and old papers, etc.) are processed.

The pulp or the old papers are placed in a funnel 5 arranged in the upper position of the pulper, and an outlet 6 allows to direct the pulp made in this manner to the next stage.

It is apparent than at the same time and during the pulping operation, the supply of vapor or hot water is provided in order to make the pulp. The supply is provided in the form of a line 7 which allows the bleaching liquid, such as hydrogen peroxide, to arrive in the direction indicated by the arrow. It is during the mixing phase that, owing to the contact of the bleaching solution with the paper pulp, bleaching is accomplished under the effect of heat supplied at a suitable intensity.

The bleaching solutions are obtained by using hydrogen peroxide, peroxide, sodium silicate, etc. Moreover, the use of a solution containing sodium silicate has an additional advantage that oxidation can take place under the action of hydrogen peroxide and is counteracted by the sodium silicate, with the latter covering all metal parts with a protective layer.

In effect, two operations were combined in one single operation:

- a. bleaching;
- b. mixing,

with the two operations being realized simultaneously.

Another type of pulper is also used. It is identical to the one in Figure 1, but operates vertically.

The shaft 2 is also provided with hooks or blades 3 which rotate on the inside of a cylinder 1 which is provided with fixed hooks 4.

The supply for bleaching the paper pulp is provided at the upper portion of the pulper and allows the flow of liquid during the mixing operation.

Another type of pulper is also used; it is illustrated in Figure 3. This pulper comprises a movable disk 8 which is controlled by a drive pulley 9; this movable disk moves in front of the fixed disk 10. Each of the disks is provided with blades which allow for better pulping of the paste or wood chips which were previously either impregnated or not impregnated with a chemical solution.

A line 7 is provided at the upper portion of the pulper in order to allow the bleaching liquid to arrive as indicated by arrow F.

Spacing of the two disks is controlled by a device such as a worm, which allows to increase or decrease the space between the two disks and thereby prevent the pulp from being ground too fine or too coarse.

These different types of pulpers allow the two operations of mixing and bleaching to be combined and thus allow the time of treatment from pulp to paper to be reduced to one operation. The entire mass is brought to a temperature of 40 to 60° by heating means such hot water, vapor, etc.

It is apparent that, depending on the speed of the pulper, the contact time of bleaching agent with the paper pulp will vary in duration, and in very rapid pulpers, the action of the bleaching agent will be less pronounced.

However, the bleaching operation is so much accelerated as a function of the mixing system with heated storage tubs that the reaction already gives 60 to 80% of the results when leaving the apparatus, and this has the advantage of decreasing the number of additional storage towers and represents a gain in time.

It will be understood that the invention is not limited to the afore-described device and that is apparent that other variations of the

embodiments are conceivable without departing from the scope of the invention.

## CLAIMS

The invention relates primarily to the characteristics below and different possible combinations thereof:

1. Method for the treatment of paper pulp, characterized in that the bleaching operation is combined with the mixing operation, with the two operations occurring at the same time; this simultaneity of the two operations allows the paper pulp to be bleached at a very fast rate, with the paper and the heat required for mixing already providing the necessary conditions for bleaching at the desired densities and dryness.

2. The treated paper pulp is placed in a storage tub in which the bleaching process is completed.

3. The device is characterized by means such as the pulper/mixer which is equipped with a conduit for a bleaching liquid which allows to accomplish the bleaching process of the paper pulp during the mixing operation.

4. The supply of bleaching liquids is accomplished by a line that enters the upper portions of the pulper.

5. The bleaching liquid is obtained by a solution of hydrogen peroxide, peroxide, sodium silicate or the like.

6. The entire pulp consisting of the paper pulp and the hydrogen peroxide is brought to a temperature of 40 to 60°C;

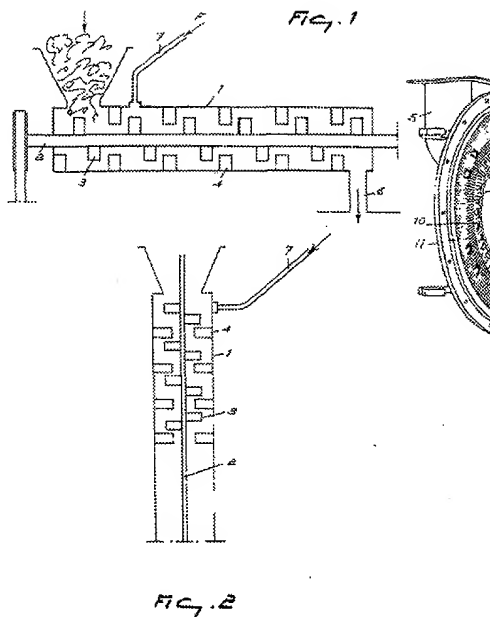
7. The pulper comprises a movable portion either in the form of a shaft with hooks or a disk comprising movable blades, with the entire unit being rotated by means of a motor.

8. The pulper comprises a fixed portion, which is provided with hooks that cooperate with the movable hooks when the pulp is ground.

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FIG. 3

